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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MCCLOUD, RENATA D	
ART UNIT	**PAPER NUMBER**
2837	

DATE MAILED: 03/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/047,728	BUSSEAR ET AL.
	Examiner	**Art Unit**
	Renata McCloud	2837

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/17/2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment filed 17 February 2004, the following has occurred: Claims 1, 12, 18, and 23 have been amended.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (U.S. Patent 4,802,143) in view of Barber (US 6,091,668).

Claim 18: Smith teaches a method for inducing seismic energy in a formation penetrated by a wellbore, comprising: coupling a tubular string (Fig. 1:1) between a downhole anchor (Fig. 11:62) and a surface vibratory source (Fig. 1:10; Col. 7:20-27 teaches that 10 revolves with the pipe for transmitting pipe strain, Col. 8:5-7 teaches that pipe strain is in the form of acoustic waves); vibrating the tubular string to generate a seismic wave in the formation at the anchor (Col. 8:21-30); determining a subsurface characteristic of the formation from detected seismic energy (e.g. Col. 7: 40-49). Smith

does not teach determining a subsurface geologic characteristic. Barber teaches determining a subsurface geologic characteristic (Col. 2: 20-33).

It would have been obvious to one having ordinary skill in the art at the time that the invention was made to use the apparatus taught by Smith to determine a geologic characteristic as taught by Barber. The advantage of this would be the ability to measure formation depletion.

Claim 19: Smith and Barber teach the limitations of claim 18. Referring to claim 19, Smith teaches at least one sensor measuring a parameter of interest (Fig. 1:9), wherein the parameter of interest is one of (i) load on the anchor; (ii) load on the tubular string proximate the vibratory source; (iii) vibratory motion of the anchor; or (iv) vibratory motion of the tubular string proximate the vibratory source (Col. 7:32-40, measures pipe strain).

4. Claims 1-7, 12,13,15-17, 21-24, 26, and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (U.S. Patent 4,802,143) in view of Cretin (U.S. Patent 4,862,425) and Barber (US 6,091,668).

Claim 1: Smith teaches an apparatus for inducing seismic energy in a formation penetrated by a borehole, comprising: an anchor device in a borehole at a selected location (Fig. 11:62); and a vibratory source at a surface location coupled to the anchor causing the anchor to impart seismic energy into the formation (Fig. 1:10; Col. 7:20-27 teaches that 10 revolves with the pipe for transmitting pipe strain, Col. 8:5-7 teaches

that pipe strain is in the form of acoustic waves); and a control unit (e.g. Fig. 1:16 has a pressure transducer 12; Col. 7:27-31) for controlling the vibratory source and for determining a subsurface characteristic of a formation (e.g. Col. 7: 40-49). Smith does not teach an anchor device engaged with the borehole at a selected location or determining a subsurface geologic characteristic. Cretin teaches an anchor device engaged with the borehole at a selected location (e.g. Fig. 1:10). Barber teaches determining a subsurface geologic characteristic (Col. 2:21-33).

Claim 12: Smith teaches a system for obtaining seismic data, comprising: an anchor device in a wellbore at a selected location; a vibratory source at a surface location coupled to the anchor causing the anchor to induce seismic energy into the formation (e.g. Fig. 1:10; Col. 7:20-27 teaches that 10 revolves with the pipe for transmitting pipe strain, Col. 8:5-7 teaches that pipe strain is in the form of acoustic waves); and at least one detector placed spaced-apart from the anchor, to detect seismic signals responsive to seismic energy imparted in the formation by the anchor (e.g. Fig. 1:16). Smith does not teach an anchor device engaged with the borehole at a selected location or determining a subsurface geologic characteristic . Cretin teaches an anchor device engaged with the borehole at a selected location (e.g. Fig. 1:10). Barber teaches determining a subsurface geologic characteristic (Col. 2:21-33).

Claim 23: Smith teaches a method for obtaining seismic data, comprising: an anchor (e.g. Fig. 11:62) in a wellbore (e.g. Fig. 1:3) in a subsurface formation at a selected downhole location; coupling the anchor to a surface located vibratory source (e.g. Fig. 3:62 coupled to 10 {Fig. 1:10; Col. 7:20-27 teaches that 10 revolves with the

pipe for transmitting pipe strain, Col. 8:5-7 teaches that pipe strain is in the form of acoustic waves}); energizing the vibratory source to impart seismic energy through the anchor to the formation (e.g. Col. 8:21-30); and sensing the seismic energy by at least one detector spaced-apart from the anchor (e.g. Fig. 1:16); and determining a subsurface characteristic of the formation from detection of the seismic energy imparted into the formation (e.g. Col. 7: 40-49). Smith does not teach engaging an anchor device in a wellbore or determining a subsurface geologic characteristic . Cretin teaches an anchor device engaged with the borehole at a selected location (e.g. Fig. 1:10). Barber teaches determining a subsurface geologic characteristic (Col. 2:21-33).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus taught by Smith to make the anchor device engaged with the borehole as taught by Cretin. The advantage of this would be secure fastening of the apparatus to the borehole while seismic energy is being transmitted.

Claim 2: Smith, Cretin, and Barber teach the limitations of claim 1. Referring to claim 2, Smith teaches a power source to drive the vibratory source (e.g. Fig. 1:11).

Claim 3: Smith, Cretin, and Barber teach the limitations of claim 1. Referring to claim 3, Smith teaches the power source is selected from a group consisting of (i) a hydraulic unit; (ii) an electrically operated device; and (iii) a pneumatic device (e.g. Col. 8:1-5, an electrical device).

Claim 4: Smith, Cretin, and Barber teach the limitations of claim 1. Referring to claim 4, Smith teaches at least one sensor to provide a measure of a parameter of interest (e.g. Fig. 1:9).

Claims 5, 7 and 22: Smith and Cretin teach the limitations of claims 1 and 12. Referring to claims 5, 7, and 22, Smith teaches the parameter of interest is one of: motion of the anchor; load on the anchor; load on a tubular string coupled between the anchor and the vibratory source; and motion of the tubular string (e.g. Col. 7:32-40, measures pipe strain-load on tubular string).

Claims 6 and 21: Smith and Cretin teach the limitations of claims 1 and 12. Referring to claims 6 and 21, Smith teaches a first sensor proximate the anchor to measure a selected parameter of interest (e.g. Fig. 1:9); and a second sensor spaced-apart from the first sensor measuring the parameter of interest to determine transmissibility of power from the vibratory source to the anchor (e.g. Fig. 1:16).

Claims 13 and 24: Smith, Cretin, and Barber teach the limitations of claims 12 and 23. Referring to claims 13, and 24, Smith teaches a control unit to control the operation of the vibratory source (e.g. Fig. 1:12).

Claims 15 and 26: Smith, Cretin, and Barber teach the limitations of claims 12 and 23. Referring to claims 15 and 26, Smith teaches the at least one detector (e.g. Fig. 1:16) is placed at a location selected from one of surface location; a location in the borehole; a secondary borehole formed spaced-apart from the borehole; or a secondary borehole that forms a part of a multibore system containing the borehole (e.g. Fig. 1:16 is at a surface location).

Claim 16: Smith, Cretin, and Barber teach the limitations of claim 12. Referring to claim 16, Smith teaches at least one detector includes a plurality of spaced apart detectors (e.g. Fig. 8:8).

Claim 17: Smith, Cretin, and Barber teach the limitations of claim 13. Referring to claim 17, Smith teaches the control unit processes the signals detected by at least one detector (e.g. Fig. 1:16 processes signals from 8).

Claims 33 and 34: Smith, Cretin, and Barber teach the limitations of claims 12 and 23. Referring to claims 33 and 34, Smith teaches the at least one detector is a geophone (e.g. Col. 7:19-21)

Claim 35: Smith, Cretin, and Barber teach the limitations of claim 12. Referring to claim 35, Cretin et al teach a plurality of fixed anchors located at a corresponding plurality of predetermined locations (e.g. Fig. 1:10).

Claim 36: Smith, Cretin, and Barber teach the limitations of claims 23. Referring to claim 36, Cretin et al teach repeating an acquisition cycle during lowering at given time periods (e.g. Col. 8:25-30).

5. Claims 9-11, 14, 25, 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith, Cretin, and Barber as applied to the claims 1, 12, and 23 above, in view of Nelson (U.S. Patent 4,188,610).

Claim 9: Smith, Cretin, and Barber teach the limitations of claim 1. Referring to claim 9, they do not teach the control unit includes a computer. Nelson teaches the control unit includes a computer (e.g. Col. 22:46-51).

Claim 10: Smith, Cretin, and Barber teach the limitations of claim 1. Referring to claim 10, Smith and Cretin do not teach the control unit controls frequency of vibration of the vibratory source in response to the sensed parameter of interest. Nelson teaches the control unit controls frequency of operation of the vibratory source in response to the sensed parameter of interest (e.g. Col. 21:54-22:10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus taught by Smith, Cretin, and Barber to include a computer and make the control unit control the frequency of operation as taught by Nelson. The advantage of this would be an apparatus that can be programmed to generate and measure seismic signals.

Claim 11: Smith, Cretin, Barber, and Nelson teach the limitations of claim 10. Referring to claim 11, Nelson teaches the control unit controls the frequency of vibration in accordance with programmed instructions provided to the control unit (e.g. Col. 21:54-22:10).

Claims 14 and 25: Smith, Cretin, and Barber teach the system of claims 13 and 23. Referring to claims 14 and 25, they do not necessarily teach the control unit controls the vibratory source in response to the signals detected by at least one detector. Nelson teaches the control unit controls the vibratory source in response to the signals detected by at least one detector (e.g. Col. 21:54-22:2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system taught by Smith, Cretin, and Barber to control the vibratory source in response to

detected signals as taught by Nelson. The advantage of this would be a system with linear coupling between the source and the earth.

Claim 27: Smith, Cretin, and Barber teach the limitations of claim 12. Referring to claim 27, Smith teaches the anchor device is a slip anvil, the slip anvil adapted to act cooperatively with a driver coupled to the vibratory source (e.g. Fig. 3:62). Smith, Cretin, and Barber do not teach the slip anvil adapted to act cooperatively with a driver coupled to the vibratory source to generate a broadband seismic signal in the formation when said driver impacts said slip anvil. Nelson teaches a slip anvil adapted to act cooperatively with a driver coupled to the vibratory source to generate a broadband seismic signal in the formation when said driver impacts said slip anvil (e.g. Col. 7:23-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system taught by Smith, Cretin, and Barber to control the vibratory source in response to detected signals as taught by Nelson. The advantage of this would be a system with linear coupling between the source and the earth.

Claims 28 and 31: Smith, Cretin, and Barber teach the limitations of claims 12 and 23. Referring to claims 28 and 31, they do not teach the seismic energy is one of (i) a single frequency and (i]) a swept frequency. Nelson teaches the seismic energy is a swept frequency (e.g. Col. 7:35-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system taught by Smith, Cretin, and Barber to make

the seismic energy a swept frequency as taught by Nelson. The advantage of this would be a reduction in undesired harmonic undulations.

Claims 29 and 32: Smith, Cretin, and Barber teach the limitations of claims 12 and 23. Referring to claims 29 and 32, they do not teach the seismic energy is a broadband signal. Nelson teaches the seismic energy is a broadband signal (e.g. Col. 3:5-12).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system taught by Smith, Cretin, and Barber to make the seismic energy a broadband signal as taught by Nelson. The advantage of this would be a system with signals that extend throughout a frequency range and covers several octaves.

Claim 30: Smith, Cretin, and Barber teach the limitations of claim 23. Referring to claim 30, they do not teach energizing the vibratory source to impart seismic energy through the anchor to the formation by energizing the vibratory source causing a driver coupled to the vibratory source to impact the anchor, the anchor comprising a slip anvil, and imparting a broadband signal through the anchor to the formation. Nelson teaches energizing the vibratory source to impart seismic energy through the anchor to the formation by energizing the vibratory source causing a driver coupled to the vibratory source to impact the anchor, the anchor comprising a slip anvil, and imparting a broad band signal through the anchor to the formation (e.g. Col. 7:23-44).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system taught by Smith, Cretin, and Barber to

energize the vibratory source to impart seismic energy through the anchor to the formation by energizing the vibratory source causing a driver coupled to the vibratory source to impact the anchor, the anchor comprising a slip anvil, and imparting a broad band signal through the anchor to the formation as taught by Nelson. The advantage of this would be a system capable of producing a multiplicity of signals in repetition.

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith as applied to claim18 above, in view of Nelson (U.S. Patent 4,188,610).

Claim 20: Smith teaches the method of claim 18. Referring to claim 20, Smith does not teach controlling the frequency of operation of the vibratory source with a control unit, the control unit having processor acting according to programmed instructions, the control unit controlling the frequency of the vibratory source in response to the sensed parameter of interest. Nelson teaches controlling the frequency of operation of the vibratory source with a control unit (Fig. 21), the control unit having a processor acting according to programmed instructions, said control unit controlling the frequency of the vibratory source in response to the sensed parameter of interest (Col. 21:54-22:10). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method taught by Smith to control the frequency of operation of the vibratory source with a control unit, the control unit having a processor acting according to programmed instructions, the control unit controlling the frequency of the vibratory source in response to the sensed parameter of interest, as

taught by Nelson. The advantage of this would be a method that provides a frequency spectrum with equal level octave bands over a frequency range.

Response to Arguments

7. Applicant's arguments with respect to claims 1-7, 9-36 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. They are: Schroeder et al (US 5,166,747), Endo et al (US 6,630,890), and Montgomery (US 5,191,326).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Renata McCloud whose telephone number is (571) 272-2069. The examiner can normally be reached on Mon.- Fri. from 8 am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi can be reached on (571) 272-2800 ext. 37. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Renata McCloud
Examiner
Art Unit 2837

RDM

ROBERT NAPPI
SUPERVISORY PATENT EXAMINER